

UNITED STATES PATENT OFFICE

THE CLASSIFICATION OF PATENTS



WASHINGTON
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PREFATORY NOTE.

Parts A and B of the following pages are designed to acquaint all persons using the Patent Office classification with the principles upon which the reclassification is proceeding.

Part C consists of a few tentative rules advanced with the notion of fixing classification practice within the office in certain doubtful cases.

Part D is intended to inform examiners reclassifying within examining divisions respecting the initial procedure in reforming a class.



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CONTENTS.

	Page.
A. Introduction.....	1
Past classifications of the U. S. Patent Office.....	1
Beginning of revision.....	2
Precedents and authorities.....	3
Definition of scientific classification.....	4
B. Principles of the new classification of the Patent Office.....	4
Elements of a Patent Office classification.....	4
Basis of classification.....	5
Art as a basis.....	5
Function or effect as a basis.....	7
Structure as a basis.....	8
Division and arrangement.....	9
Infinitude of possible combinations.....	10
Division and arrangement in the natural sciences.....	10
Difficulty of entitling a subclass corresponding to every combination.....	11
Expedients to reduce the number of subdivisions.....	12
Superiority and inferiority.....	15
Definite positional relationship of subdivisions.....	16
Indented schedules.....	17
Bifurcate division.....	19
Utility of arrangement according to resemblances.....	19
Definition.....	20
Cross-references and search-notes.....	21
Diagnosis to determine classification.....	22
Claimed or unclaimed disclosure.....	22
Diagnosis of pending applications.....	23
Difficulties due to varying ideas of claims.....	25
C. Rules of classification.....	26
Basis of classification.....	26
1. "Art" as the basis.....	26
2. Operative or manipulative arts.....	26
3. Structures.....	26
4. Composition of matter and formed stock.....	26
Division and arrangement.....	27
5. Exhaustive division; miscellaneous subclass.....	27
6. Subclasses not to overlap.....	27
7. Subclasses of any group to be formed on one basis.....	27
8. Apparent exception to rules 6 and 7.....	27
9. Relative position of subclasses.....	27
10. Indention of subclasses.....	29
11. Different kinds of titles for subclasses.....	29
12. Arrangement to limit search and cross references.....	30
Definition.....	30
13. Tentative definition.....	30
14. How to define.....	30
15. Explanatory notes may sometimes displace definition.....	31

C. Rules of classification—Continued.	Page.
Cross-references and search-notes.....	31
16. Impossibility of cross-referencing all disclosures.....	31
17. Occasion and direction of cross-referencing.....	31
18. Occasion and scope of search-notes.....	32
Diagnosis to determine classification.....	32
19. Patents diagnosed by claimed disclosure.....	32
20. Patents diagnosed by most intensive claim.....	33
21. Exception to rule 19, claim for a part of a disclosed combination.	33
22. Exception to rule 19, claims for a part of a disclosed combination.	33
23. Exception to rule 19, generic combination old as matter of com-	
mon knowledge.....	34
24. Exception to rule 19, article of manufacture defined only by	
material.....	34
25. Exception to rule 19, utilizing a composition.....	34
26. Exception to rule 19, utilizing a machine.....	34
27. Patents having claims for several different inventions.....	35
28. General rule of superiority between statutory kinds of invention.	35
29. Exception to rule 28.....	35
30. Process and apparatus.....	36
31. Article of manufacture and instrument for making a part of it or	
performing any minor act relative thereto.....	36
32. Process and product where search for the process would have to	
be made among machines.....	36
33. Process and product where search for the process would have to	
be made among products.....	36
34. Process of making a composition and the composition where	
the process is peculiarly adapted to make the composition....	37
35. Article of manufacture or composition and process for making	
one of the parts of the article or ingredients of the composition.	37
D. Procedure in reclassifying within examining divisions.....	37
1. General attitude.....	37
Procedure involving only cursory scrutiny of familiar patents—	
2. Consider wholes in forming tentative subdivisions of subclasses..	38
3. Write tentative definitions of subdivisions.....	38
4. Consider the significance of analogies found to traverse parts of	
two or more existing subclasses.....	38
5. Arrange groups on parallel or accordant lines where practicable..	38
6. Watch for subcombinations deserving separate recognition....	38
7. Consider whether the groups collectively will constitute a proper	
class and their best correlation.....	38
Procedure involving rigorous analysis—	
8. Diagnose each patent for original classification.....	39
9. Group and consider the disposition of patents deemed foreign to	
the class.....	39
10–15. Consider and indicate cross-referencing within and to and	
from the class.....	39, 40
Note.....	40

THE CLASSIFICATION OF PATENTS.

(A) INTRODUCTION.

Classification lies at the foundation of the mental processes. Without the power of ~~perceiving~~ perceiving, recognizing resemblances, distinguishing differences in things, phenomena and notions, grouping them mentally according to those resemblances and differences, judgment is impossible, nor could reason be exercised in proceeding from the known to the unknown.

* * * * *

The facilitation and abbreviation of mental labor is at the bottom of all mental progress. The reasoning faculties of Newton were not different in qualitative character from those of a ploughman; the difference lay in the extent to which they were exerted and the number of facts which could be treated. Every thinking being generalizes more or less, but it is the depth and extent of his generalizations which distinguish the philosopher. Now it is the exertion of the classifying and generalizing powers which thus enables the intellect of man to cope in some degree with the infinite number and variety of natural phenomena and objects. (Jevons, Principles of Science.)

PAST CLASSIFICATIONS OF UNITED STATES PATENT OFFICE.

As under the patent laws the people of the United States assume all the risks in granting a patent for any means of the "useful arts," a classification that will facilitate a judgment respecting the patentability of any means presented to the Patent Office is of peculiar moment. The enormous extent, diversity, and refinement of the useful arts preclude the formation of a judgment on novelty within a reasonable time, unless the necessary comparisons with known processes and instruments have been previously made along the lines that searches must follow and the results of such comparisons made available in a classification. The vast majority of available disclosures of the arts occur in patents. Hence the Patent Office classification must be adjusted in the main to the analysis, diagnosis, and orderly arrangement of the disclosures of patents.

For more than 80 years United States patents have been classified. The first published classification, promulgated in 1830, comprised 6,170 patents, divided into 16 classes. The change from a registration to an examination system in 1836 instigated a new classification in 22 classes, including 9,800 patents. The next came in 1868 with 36 classes, including about 75,000 patents. On March 1, 1872, a revised classification was adopted, comprising 145 classes, including 131,000

patents. This classification is said to have been planned by Dr. Edward H. Knight. The placing of the patents in accordance with the schedule of classes is said to have been done by the several examiners. The class arrangement was purely alphabetical by class titles, and the number designations followed the alphabetical order. The names of things to be found in the several classes were arranged alphabetically under each class title. No attempt was made to bring the titles of allied materials into juxtaposition or to effect other definite arrangement with reference to subject matter in the printed schedules. A consolidated name index supplemented the list of names by classes.

This classification of 1872 is in part the classification that now exists, many of the same class numbers and titles being still in use. Examiners were apparently permitted to make changes in classification to suit their convenience without notice until 1877. In that year a revision of the published schedule was made by a committee, resulting in the addition of 13 new classes, and examiners were ordered to transfer patents in accordance with the new titles. The first classification published with distinct subclasses appeared in 1880. From that time until 1898 the classification grew by addition and subdivision of classes to suit the ends of individual examiners or in response to supposed exigencies of the work where one division was thought to be overloaded and another underloaded, and the alphabetical arrangement of subclasses under each class has succeeded the alphabetical list of names. The arbitrary correspondence originally established between the alphabetical order of class titles and the numerical order was destroyed as soon as expansion of the classification began.

However suitable to the then-existing material of the useful arts the classification of 1872 may have been, it failed as fail all inductive processes wherein the generalizations are not broad and deep. (Isaac Newton's intellect could detect the resemblance between the falling fruit and the motions of the planets.) The classification of 1872 was not exhaustive; it failed to recognize to the fullest extent what Bishop Wilkins saw nearly 300 years ago, to wit, that there are "arts of arts;" and it failed to provide for future invention of new species in the same art, and to recognize that new arts could be formed from combinations of the old.

BEGINNING OF REVISION.

The Classification Division was created in the hope that guiding principles of classification could be developed and applied for the purpose of amending or revising the classification whereby patents could be placed with greater assurance, and whereby the searcher

with these guiding principles in mind might find the nearest references. It was confronted with the problem of revising while at the same time keeping accurate record of all changes, correcting all indexes of patents, and using copies in constant demand for search at the same time, necessitating much clerical work, and constant interruption—of correcting rather than planning anew; of mending a machine while constantly increasing duty was required of it.

Ideas on the subject of revision were called for by the Commissioner of Patents, and all in the Patent Office had an opportunity to set forth their notions. The views of one met with approval and in accordance with those views a "Plan of Classification" was prepared and promulgated in 1900. What other plans may have been submitted is not now generally known. But in substantial accordance with that published plan, the process of revision has proceeded for more than 14 years until approximately 50 per cent of the patents (including incomplete work) have been placed in revised classes.

PRECEDENTS AND AUTHORITIES.

No effective precedents have been found in any prior classifications of the arts. The classifications of the principal foreign patent offices have not been materially different in principle from the United States Patent Office classifications of the past.

The divisions found suitable for book classification for library use, have not been deemed adequate to the exactness and refinement essential to a patent office classification of the useful arts. The systems of class and subclass sign or number designations of the modern library classifications, with their mnemonic significance, afford the most important suggestions to be drawn from library classification. None of these systems of designation has been adopted, (1) because of a serious doubt as to the availability of such designations by reason of the length or unwieldiness to which they would attain in the refinements of division necessary in a patent office classification, and (2) because of the enormous amount of labor necessary to make the change from present practice.

The best analogies are in the known (but changing) classifications of the natural sciences, and in them the problems are so different that they can serve only to illustrate general principles. The broad principles of classification are well understood. The authorities are the logicians from the ancient Aristotle to the modern Bentham, Mill, and Jevons. The effort of the Classification Division has been to adapt and apply these well-known principles to the enormously diversified useful arts, particularly as disclosed in patents and applications for patents.

DEFINITION OF SCIENTIFIC CLASSIFICATION.

It may be well to insert here an authoritative definition: "A scientific classification is a series of divisions so arranged as best to facilitate the complete and separate study of the several groups which are the result of the divisions as well as of the entire subject under investigation." (Fowler, Inductive Logic.)

Investigation and study of any subject will be facilitated if the facts or materials pertinent to that subject be so marshaled and arranged that those most pertinent to it may appear to the mind in some form of juxtaposition. It is the purpose of the Patent Office classification to divide and arrange the body and multitudinous units of the useful arts so that, having the question of novelty of any defined means to answer, one may with reasonable assurance approach that portion of the rank of arts in which it will be found if it is not new, and in propinquity to which will also be found those means that bear the closest resemblances to that sought for, the resemblances of other units growing less in proportion to their distance therefrom.

Success in the fundamental aim of facilitating adequate search should evidently at the same time reduce proportionately the danger that interfering applications will be overlooked and also effect a distribution of labor favorable to the acquisition of special skill.

(B) PRINCIPLES OF THE NEW CLASSIFICATION OF THE PATENT OFFICE.**THE ELEMENTS OF A PATENT OFFICE CLASSIFICATION.**

A classification will be useful in proportion (1) to the pertinence to the subject under investigation of the facts selected to be grouped together, or, in other words, in proportion to the appropriateness of the "basis of classification" to the subject in hand; (2) to the convenience, stability, and uniformity of the arrangement of the subdivisions whereby the investigator may proceed with reasonable assurance to that portion of the rank of groups within which he will find cognate material; (3) to the accuracy and perspicuity of the definitions of the several divisions and subdivisions; (4) to the completeness and reliability of the cross-referencing and cross-notations; (5) to the uniformity, feasibility, and certainty of the rules by which the accessions of patents disclosing one or several inventions may be diagnosed and distributed to the appropriate divisions of the classification in accordance with the basis adopted.

Corresponding to the foregoing analysis the theory of Patent Office classification may be treated in five parts: (1) The principles on which the arts shall be divided (basis of classification); (2) subdivision and mechanical arrangement of groups; (3) definition; (4) cross-referencing and search-notes; (5) the choice of features by which a patent shall be assigned in the classification (diagnosis).

BASIS OF CLASSIFICATION.

The first and most vital factor in any system of classification is the basis of division, that is, the kind of characteristics common to any number of objects selected to characterize groups, whereby the individuals of any group will resemble each other for the purpose in view more closely than any individual in any group will resemble any individual in any other group.

"There is no property of objects which may not be taken, if we please, as the foundation for a classification or mental grouping of those objects, and in our first attempts we are likely to select for that purpose properties which are simple, easily conceived, and perceptible in a first view without any previous process of thought—but these classifications are seldom much adapted to the ends of that classification which is the subject of our present remarks." (J. S. Mill, *System of Logic*.)

It is clear that a number of objects may be classified on several different bases. For example, a number of books could be divided into groups (1) according to the subject of their contents; (2) according to the language in which the books are written; (3) according to the size of page; (4) according to the binding material; or (5) according to the color of the binding. Each of these may be useful classifications for some purpose. For the student of literature none is of value except the first; for the connoisseur in bindings, only the last three. A classification of animals including classes of land animals and water animals would hardly suit a student of zoology, as it would associate with the shad and perch such differently organized creatures as the porpoise, whale, and seal. Yet such a classification might prove very suitable for a student of fisheries.

*Art as a basis.*¹—So in seeking a basis for a patent office classification the purposes of the classification should be the guide. Allegations of ulterior uses² (such as may be made merely because the inventor thought of applying his invention to those uses only, or in an effort to get the application examined in a certain division) and other superficial bases should be avoided. That basis will best suit the purpose which effects such an arrangement as will exhibit in suitable groups the "state of the prior art," by which is here meant not necessarily all the instruments of a trade or industry, or all the articles sold by a shopkeeper, as a stationer, but those means that achieve

¹ An "art," in the sense of a single unitary invention, is a synonym of process, method, and operation. The term "art" is ambiguous in popular usage. In the phrase "useful arts" in the Constitution, it denotes the area of endeavor to which the patent laws apply. When the word "art" is used to specify some fragment of the useful arts, it commonly raises different notions in different minds. It may be correctly used to designate *any* division of the useful arts. It is as proper to speak of the art of grinding or the art of molding as of the art of metal-working or the art of brickmaking.

² A "use" is an application of a means to substance to produce an effect which may or may not be the necessary effect of the means in its normal operation. A catalytic may be used to ignite gas or to convert oleins into stearines. A nippick may be used to hold a chalk line or prick holes in leather, etc.

similar results by the application of similar natural laws¹ to similar substances.

As all inventions are made with the ultimate object of satisfying some human desire, the utility of an invention appears to be a natural basis of classification. It is apparent, however, that most inventions may contribute to numerous utilities besides the ultimate one. Many processes and instruments intervene between the seed planter and the wheaten rolls upon the breakfast table. The plow may be viewed as an agricultural instrument or as an instrument of civil engineering, according as it is used for preparing the field for planting or rounding a road. A radiating coil of pipe may be thought of as a condenser of steam or of alcoholic vapors, according as it is applied to one material or another; as a cooler or a heater, according to the temperature of a fluid circulated through it. A hammer may drive nails, forge iron, crack stone or nuts. Underlying all of these ulterior utilities, there is a fundamental one to which the normal mind will reach in its natural processes and there rest. The plow loosens or turns over the surface of earth; the coil effects an exchange of heat between its interior and exterior; the hammer strikes a blow. A classification of plows in agriculture, road building, or excavating, according to stated ultimate use; of a radiator coil as a steam condenser, still, jacket-water cooler, refrigerator, or house heater; of the hammer as a forging tool, a nail driver, or a nut cracker, appears to separate things that are essentially alike. But classifying a plow on its necessary function of plowing, a radiator on its necessary function of exchanging heat, a hammer on its necessary function of striking a blow, evidently results in getting very similar things together. Assuming for the moment that utility is a reasonable basis of division of the useful arts, it is deemed more logical to adopt as a basis some utility that *must* be effected by the means under consideration when put to its normal use rather than some utility that *may* be effected under *some* conditions. Two of the five predicables of ancient logic are property² and accident.³ The capacity of the hammer to strike a blow, the capacity of the radiator coil to exchange heat, are in the nature of properties. The capacity of the hammer to crack nuts, of the coil to condense steam, are in the nature of accidents—something that follows

¹By "natural law" in the useful arts is meant that uniformity of action which is manifested whenever any particular substance in any particular condition is brought into such relation with any particular manifestation of energy that the force exerted modifies or prevents modification of the form, nature, condition, or locus of the substance or modifies the manifestation of energy or both.

²A "property" may be described as any quality common and essential to the whole of a class but not necessary to mark out that class from other classes. Thus, all wheel tires may be said to possess annularity; but washers and finger rings are also annular. A "peculiar property" is one that not only always belongs to a class of objects but belongs to that class alone; thus a circle has the peculiar property of containing the greatest space within a line of given length, and catalytic substances have the power of setting up chemical reaction without themselves being changed.

³An "accident" is any quality that may indifferently belong or not belong to a class without affecting the other qualities of the class. That a man's name is James is an accident telling nothing of the man's physique or character.

from the impact and the heat exchange because of the particular accidental conditions of operation. To select an accident as a basis of classification is contrary to the laws of thought.

It may be said then that the Patent Office classification is based upon "art" in the strict sense in which the word may be said to be used in section 4886, Revised Statutes, but not necessarily in the looser sense of industries and trades. A proper maintenance of the distinction between the word "arts" of the statute and the phrase "industrial arts" used in the sense of industries and trades is essential to an effective classification for the purposes of a patent office search. Similar instruments have been patented in three different classes, because of the statements that one was designed for cooling water, another for heating water, another for sterilizing milk; in four different classes, because of the statements that one apparatus was to separate solids from the gases discharged from a metallurgical furnace, another to separate carbon from the combustion gases of a steam-boiler furnace, another to remove dust and tar from combustible gas, and another to saturate water with carbon dioxid. Owing to the continuance of a classification based largely on remote use, many applications come into the office setting forth inventions of very general application which nevertheless have to be classified more or less arbitrarily in one of several arts in which they may be used but to which they are not limited.

*Function or effect as a basis.*¹—Means of the useful arts are related in different degrees. Resemblances selected as bonds for a number of inventions may be more or less close. It is axiomatic that close resemblances should be preferred over looser ones for classification purposes. Processes and instruments for performing general operations, such as moving, cutting, molding, heating, treating liquids with gases, assembling, etc., are more closely bonded than those for effecting the diverse separate successive operations directed toward complex special results, such as making shoes, buttons, nails, etc. Means of the former sort perform an essentially unitary act—the application of a single force, the taking advantage of a single property of matter. Those of the latter sort require the application of several different acts employing frequently a plurality of forces or taking advantage of several properties of matter. In the former case, classification can be based on what has been called function, in the latter it cannot be

¹ "Effect" or "result" is the consequence of a process of the useful arts practiced with or without instruments. The effect of an instrument is the effect of its operation. Effects may be direct or indirect, proximate or remote, necessary or accidental.

"Product" is an effect consequent upon a process that changes the form, state, or ingredients of matter perceptibly and permanently, as distinguished from effects that are fleeting or involve no change in perceptible form, state, or ingredients of matter.

"Function" is the "action of means upon an object while producing the effect." (Robinson.) Functions may be direct or indirect, proximate or remote, necessary or accidental. The direct, proximate, or necessary function of the hammer in normal operation is impacting. Indirect, remote, or accidental functions of a hammer may be comminuting, forging, driving, etc.

based on function but can be based on what has been called effect (or product).

Function is closely related to cause. It is an axiom of logic that cause is preferable to effect as a basis of those classifications designed for scientific research. Hence the functional basis is preferred in all cases in which it can be applied. A condenser for the fumes of zinc is much more like a condenser for the fumes of acid or the vapor of water than it is like the art of recovering zinc from its ores, and it employs only one principle, to wit, heat interchange. A water-jacket for cooling the walls of a gas-producer or glass-furnace is much more like a water-jacket for cooling the walls of a limekiln or steam-boiler furnace than it is like the art of gas-making or manufacture of glass articles. In accordance with what are thought to be the correct principles, therefore, the zinc-condenser ought not to be classified as a part of the art of metallurgy, nor the water-jacket as a part of the art of gas-making, merely because these instruments have a use in these arts, but should be included, respectively, in classes based upon the more fundamental utilities effected by them.

Although it is evident that molding a button is more like molding a door-knob than it is like making buttons by the combined operations of sawing, grinding, turning, and drilling, wherefore the molding of buttons should be classified in a general plastic art rather than in a special button-making art, yet the making of buttons by a plurality of different kinds of operations can be placed only in a class based upon the product, to wit, button-making. Since, therefore, the combination of many different operations for the production of a specific article can not be classified on the basis of any single function, it must be classified on the basis of product. Thus by selecting essential function as a basis when possible, and resulting effect when the functional basis is not possible, one may approximate to the correct classification described by Herbert Spencer as follows: "A true classification includes in each class those objects that have more characteristics in common with one another than any of them have with objects excluded from the class."¹

So it is deemed better to classify in accordance with the function or effect it is known a means *must* perform or accomplish than in accordance with the *object* with respect to which an act or acts are directed or in accordance with some *effect* which may or may not result.

Structure as a basis.—The phrase "structural classification" is frequently made use of. The application of the phrase to processes is manifestly absurd. The Patent Office never had a structural classification except in a limited sense. How could a machine, for example, be classified on structure, leaving out of consideration its function and the effect of its normal operation? In the refinements of sub-

¹ Classification of the Sciences.

division, however, it becomes frequently desirable to form minor subdivisions on structural differences. And it may also be that instruments will be presented for classification that are of such general utility as to baffle the efforts of the intellect to attain to the fundamental and necessary function, in which case a structure-defined class may best suit the needs of classification.

As between a classification based upon structure and one based upon utility, the choice has been for the latter, without prejudice, however, to instances that may arise in favor of the former.

The subject of structural classification will be dropped with a quotation from the original pamphlet "Plan of Classification," etc. (p. 5): "A purely 'structural' classification is almost impossible on account of the infinite variety of mechanical combinations, and to attempt it would probably result in utter confusion, for the classes could not be defined, and the classification would be a mere digest of mechanical elements having no community of function."

DIVISION AND ARRANGEMENT.

Having divided the aggregate of things to be classified into a large number of groups on a satisfactory basis, a most useful work will have been accomplished and the purpose of a classification to assemble the things most nearly alike and separate them from other things will have been partially achieved. Unless these numerous groups are arranged in some definite understandable relation to each other, or are placed in definite known positions where they can be found, the mere formation of the groups, on however good a basis, is not a complete classification. Furthermore, unless the position of each group with respect to those other groups that resemble it in whole or in part is made known, he who wishes to find other related matter must seek aimlessly with no assurance that his quest will end until the whole series shall have been investigated. Each classified group is metaphorically a pigeonhole to contain similar material. If the pigeonholes are properly labeled, one can ultimately locate those that contain the matter he is seeking if he knows the name that has been applied to it. If the pigeonholes are arranged in alphabetical order, for example, he may find all related material, *provided he knows the name of every related group of material*, even though very similar things may bear names as far apart as A and Z. But if all things were so placed that, adjacent and in certain fixed relation to each pigeonhole, other related matter could be found, the resemblances lessening in proportion to the separation, and if the entire area of pigeonholes were divided, and certain areas assigned to certain kinds of things defined in general terms, guessing the location of and desultory search for things that may have different names, but yet be very much alike, would be lessened and all cognate material be bunched. A second vital factor of a system of classification, therefore, is the arrangement of the groups.

Infinitude of possible combinations.—There are now over 1,125,000 United States patents, each presumptively covering a creation of the useful arts that is different from every other. Most of these patents also disclose a plurality of elements or acts. Each of these patented means is potentially an element of a more complex combination that may be patented. When one considers merely the number of forms of energy, the number of known substances and known mechanical elements, and attempts to figure possible combinations and permutations, it becomes apparent that the size of the numbers resulting is incomprehensible. Consider the possibilities of combination also of the enormously varied disclosures of patents. Calculations of the possible combinations and permutations of a small number of objects are familiar. Different combinations of the letters of the alphabet are sufficient to record the sum of human knowledge in many languages. With substantially two octaves of the diatonic scale the world's melodies have been sounded, nor do any doubt that our successors will thrill to airs that we have never heard. "Thirty metals may be combined into 435 binary alloys, 4,060 ternary alloys, 27,405 quarternary alloys" (Jevons). This does not take into consideration differences in proportion that figure so largely in results in the arts of substance-making. The total number of possible alloys of the known metals is incomprehensible. A moment's thought respecting the numbers of the means of the useful arts will alleviate any fears that the possibilities of invention are near the limit and will give food for further thought to all concerned with this attempt to classify the useful arts to the point of refinement necessary to enable this office to pass judgment with reasonable speed and accuracy upon the approximately 75,000 applications filed each year.

Division and arrangement in the natural sciences.—Some of the natural sciences are said to be in what is known as the classificatory stage of development. In some sciences the subject of classification has been predominant and these furnish excellent examples of scientific classification.

The much-admired classifications of zoology, botany, and mineralogy are among the best available models of logical division,¹ systematic and analytical arrangement. The most casual consideration of these classifications, however, renders apparent the relative simplicity of the task of classifying natural objects differentiated by fixed natural laws as compared with the task of classifying the products of the creative and imaginative faculties as applied to the useful arts. The chimera and other animal monsters occur only as figments of the mind. Zoological classification does not have to classify combinations of birds, fishes, reptiles, and mammals, nor

¹ Logical division is the process by which the species of which a genus is composed are distinguished and set apart. Physical division or partition is the process by which the parts of any object are distinguished and set apart. Metaphysical division is the process by which the qualities of a thing are segregated and set apart in thought.

does it deal in the way of classification with the parts of animals, nor is the question of absolute numbers of instances a matter of moment to such a classification, all of the members of a species being alike for classification purposes. But any instrument of the useful arts may be combined with some other, any part with some other part. Organizations may be parts of some other organizations, or even mutually parts of each other, as, for example, a pump may be a part of a lubricator, or a lubricator may be a part of a pump. Some parts are peculiar to one instrument, some are common to many. Every member of a species differs from every other member. Added to this, the intellectual differences between the persons who present the applications for patent, the differences in their generalizing powers, the relatively broad and narrow views of two or more persons presenting the same invention (variations not indulged in by nature) complicate the problem of classifying the useful arts.

Difficulty of entitling a subclass corresponding to every combination.—In any main class or group of the useful arts there are always a number of characteristics that it may be desirable to take note of in subdivision titles. A moment's thought shows the impossibility of taking care of any large number of combined characteristics so as to provide exactly for each combination, for the reason that the limitations of space and of the perceptive faculties forbid. For a simple illustration, the imaginary classification of books for use by a bookseller may be recurred to. The dealer, it may be assumed, has books on (1) four different subjects, history, science, art, and fiction, (2) each printed in four languages, English, German, French, Spanish, (3) in four different sizes of page, folio, quarto, octavo, duodecimo, (4) bound in four materials, leather, rawhide, cloth, paper. Here are four main characteristics, each in four varieties. A customer is likely to ask for *Ivanhoe* in English, octavo, bound in leather. Now if the bookseller had sought to arrange the books into one class according to subject matter, into another according to language, another according to size, another according to binding, he would have fallen into confusion, because his classes would be formed on different principles or bases and overlap. Some histories will be in French, some will have octavo pages, and some cloth bindings. But if he divides first on the basis of subject matter, then each subject matter into language, each language book into sizes, each size into material of binding, he can immediately place his hand on a class wherein the book will be if he has it; but this classification, based on four different characteristics and four varieties of each, has necessitated the formation of 256 classes or divisions, and if five characteristics were provided for, 1,024 divisions would be required.

Adapting the illustration of the books to a patent office classification: If it were possible to view these characteristics as patentable

in combinations of all or in any combinations less than all, and also as separate characteristics, 16 divisions additional to the 256 for each independent characteristic would have to be provided, as well as other divisions for combinations of less than the whole, in order to make the classification absolutely indicative of every feature, and the number of divisions would be enormous. In such a classification, after the proper division had been located, the search would be nothing, the difficulty would be to find the appropriate class.

Expedients to reduce the number of subdivisions.—Fortunately most people carry on their mental processes in accordance with certain uniformities. Under this uniformity of thought no patentable relationship may be alleged between a quarto volume and the subject of history or between a leather binding and the German language; wherefore 4 classes of coordinate value, based on the 4 characteristics, each divided into 4 subclasses, 16 divisions in all, may serve the purpose of a Patent Office search. But if, as sometimes happens, a patentable relationship had been assumed and admitted between a leather binding and any of the languages, or any of the subjects, or between any two or more of those different characteristics, provision could be made for such combinations by the following expedients:

(1) Arrange the characteristics, in the order of relative significance or importance for the purpose in view, in four groups, giving each group the characteristic title. Under each title arrange the varieties in a similar relation as follows in either (1) or (2):

(1)	(2)
Cl. X.—BOOKS.	Cl. X.—BOOKS.
0. Miscellaneous.	1. Subject-matter—
0.5 Subject-matter—	2. History.
1. History.	3. Science.
2. Science.	4. Art.
3. Art.	5. Fiction.
4. Fiction—	6. Language—
4.5 Language—	7. English.
5. English.	8. German.
6. German.	9. French.
7. French.	10. Spanish.
8. Spanish.	11. Size—
8.5 Size—	12. Folio.
9. Folio.	13. Quarto.
10. Quarto.	14. Octavo.
11. Octavo.	15. Duodecimo.
12. Duodecimo.	16. Binding—
12.5 Binding material—	17. Leather.
13. Leather.	18. Rawhide.
14. Rawhide.	19. Cloth.
15. Cloth.	20. Paper.
16. Paper.	

Subject-matter, assumed to be the most important characteristic, is placed first. Any exhibit of mere material for binding, mere size, mere language, or mere subject-matter, would fall into the correspondingly entitled group. If, however, a book on history in German or a history in red leather, etc., were to be classified, it would be placed in subclass "History" in the subject-matter group, and a French book in green cloth would be placed in subclass "French" in the language group. That is, combinations of any characteristic with any one or more other characteristics may be placed in the group for that characteristic deemed the most significant and which is highest in the schedule. Again, by assigning a number to each generic title, each such title becomes thereby the miscellaneous group for varieties other than those indented under it, as well as for all varieties associating any characteristic with one or more of those standing lower down. Thus, a book of poems would belong in subclass "Subject-matter" and a 16mo volume bound with purple celluloid covers would belong in subclass "Size." So, by giving meaning to relative position, exhaustive arrangement is sought to be provided in a reasonable number of groups. To provide for other features that may be presented in future, an additional miscellaneous group may be added at the top (1), or the class title (2) might be deemed to represent the unclassified residue and a depository for future matter not specifically provided for.

(2) If the number of instances of association of subject-matter and binding materials, language and size, etc., are numerous, additional groups might be placed above the groups having the names of the characteristics, the fact of the existence of these groups indicating that the characteristic groups are for single characteristics only and do not include books having several different ones. In such case the schedule might be headed by a miscellaneous group, having either the title "Miscellaneous" or the title of the class, to receive associated characteristics not provided for by specific titles, immediately followed by subclasses for the particular associations found to be most numerous, as follows:

BOOKS.

- Miscellaneous.
- Subject-matter and language.
- Subject-matter and binding material.
- Subject-matter.
- Language.
- Size.
- Binding material.

To illustrate further, selecting for the purpose a mass of objects presenting problems more nearly like those presented to the office in

questions of patentability, let it be assumed that one is to classify the objects in a heap of metal scrap.

On looking over the material of the heap it is noticed that there are a large number of metal balls; some have holes through them, some are hollow, some are smooth on the outside, and some are hollow, smooth, and perforated, but they are all nevertheless balls, and accordingly all balls can be separated out and placed in a heap by themselves. Next, the presence of bars in the general mass is observed, some long, some short, some straight, some twisted, some of round stock, some of square stock, etc. These may be gathered together and placed in a separate pile at the left of the balls. It is further observed that there are many differently shaped annular bodies in the heap resembling generally the single links of a chain, some circular, some elliptical, some twisted, some made of round stock, some of square stock, etc. They are all nevertheless annular bodies; these may be placed in a separate pile at the left of the bars.

Now, in the remnant of the original heap, a sufficient number of similar single elements does not remain from which to make a smaller pile of elements. Different combinations of links, balls, and bars are, however, observed in the remaining heap. Some are combinations of links, some combinations of a ball and link, some of a bar and link, and some of a bar, link, and ball. These different combinations may be separated out in the order named and placed in separate piles. After all these things have been removed, there is left in the original heap a number of odds and ends or miscellaneous metal objects.

These several groups may now be arranged in the inverse order in which (in the particular illustration adopted) they have been removed, thus:

1. Miscellaneous (remnants of the original heap of scrap).
2. Combined bar, link, and ball.
3. Combined bar and link.
4. Combined bar and ball.
5. Combined link and ball.
6. Chains.
7. Links.
8. Bars.
9. Balls.

Knowing that objects of metal scrap not covered by the specific titles will be found in the miscellaneous group, and that the more complex specifically-named things are to be found first after the miscellaneous or at the left of the row of piles of materials thus separated and arranged, and the more simple things and parts farther to the right, the particular piles to resort to for the things

wanted may be definitely determined. The same processes may be applied to each of the piles. Thus, balls, in the above illustration, may be divided into—

Balls—

10. Hollow perforated.
11. Hollow grooved.
12. Hollow.
13. Perforated.
14. Grooved.

Again, the same processes may be applied to a mass of more diversified junk, of which the metal scrap may form one pile, rags another, old bricks another, old timber another, and, still another, timber having metal-straps, bolts, nails, etc., connected with it.

Superiority and inferiority.—In the arrangement of subclasses in a class, those groups that are related to each other as wholes and parts are arranged so that the wholes shall stand before the parts, and so that subclasses defined by effect or by special use shall stand before those defined by function or general use. For example, in the scrap illustration above, assuming the titles to be in a printed arrangement, “chains” precedes “links,” which may be parts of chains, and if it had been desired to separate animal-drags, for instance, from the scrap, some animal-drags being particular adaptations of a bar, links, and ball, the group of animal-drags should precede “Bar, link, and ball.” The words “superior” and “inferior” have been used to indicate this relationship. A class or subclass defined to receive a certain combination is superior to one defined to receive an element or a combination that is a part of that certain combination. A class or subclass defined to receive means for making a particular product, as an electric lamp, is superior to a class or subclass designed to perform a general function, as pumping air from a container. And whenever a question of assignment of a patent or application that contains matters of two or more groups bearing that relation is raised, the “superior” group is selected to receive it.

Further, in those instances in which groups are formed on different bases or different characteristics, not comparable with each other, and a patent is presented having matter falling in each group, that group which is highest in position is preferred in those instances where separate provision for means having both characteristics has not been made.

In cases of necessity, as where a combination is presented for which no class has been definitely provided, but classes exist into which the several parts would fall if separately claimed, the same practice that obtains in similar situations with respect to two or more *subclasses* of a class may be followed with respect to two or

more *classes* and the patent placed in that class which, in accordance with above-stated principles, should be deemed the "superior."

Definite positional relationship of subdivisions.—In the metal scrap example, above, division has been effected on the one basis of form or contour. If it had been desired to separate also on material, for example, if it were deemed important to locate all brass scrap, each of the groups based upon form could be divided into one of *brass* and one *not brass*, or the entire heap could be divided into *brass* and *not brass*, and under the heading "brass" could be indented the various articles made of brass, and under "not brass" the various articles not made of brass, and this would double the number of divisions. If also it were desired to separate the lead articles in the same manner the number of classes would be tripled. But, as in the book illustration, it may be impracticable thus to multiply subdivisions, and the basis "form" having been selected as of *first-rank* importance, all divisions based upon form should be completed and kept together. Then, "material," having been selected as of *second-rank* importance, should be carried out with respect to all objects in which form is non-essential. If enough brass balls were found to render it advisable to make a subdivision of them, they should be assembled into a subclass indented under "balls" and not into a subclass indented under "brass." Having selected one basis as *primary*, it should never subsequently be made *secondary* or *vice versa*. Some such restriction on modes of division appears salutary in a system of divisions designed to definitely limit search. The arrangement herein sought to be explained is susceptible of use to limit all searches for a single definitely stated invention to a subclass properly entitled to receive it or those indented under it, and to those subclasses above, which may include it as a part of an organization or specialized means.

As between coordinate groups divided on the same basis, there is no question of superiority and inferiority. The terms "superior" and "inferior" are useful in questions of relationship between combinations and subcombinations or elements thereof, and between groups founded on effect or product and those founded on simple function. The mere difference in complexity of mutually exclusive coordinate groups involves no relationship of superiority or inferiority. A subclass to receive a screw-cutting lathe is superior to a subclass to receive a lathe-headstock, a locomotive class is superior to a class to receive steam-engines, for the reason that the lathe is a whole of which the headstock is a part, and the locomotive is an organization of which the engine is an element. But the headstock subclass is not superior necessarily to the tailstock subclass simply because the headstock is commonly more complex than the tailstock. Yet arbitrary preference for classification in the headstock subclass may be

established by position where an application or a patent contains claims for both.

Thus in a class that is founded on a well-chosen basis that brings together things bearing close resemblances to each other, all types that contain the elements essential to produce a complete practically operative means will be found in subclasses that have a position somewhere between the beginning and end of the list of subclasses of the class. Those that add features of elaboration of the essential types and those that are highly specialized to some particular purpose within the definition of the class will stand above the essential type subclasses, while those subclasses for parts and details will stand below those for the essential types.

Indented schedules.—In an indented schedule all subclasses in the first column reading from the left are species to the genus represented by the class title.¹ All subclasses indented under another subclass are species to the genus represented by the subclass under which they are indented. If a title has no number, it represents merely a subject-matter to be divided, a genus,—having no representatives except in the species under it. If a subclass having a generic title has a number, it not only represents a subject-matter to be divided into species but also all other species not falling within the titles indented. Although these relative positions might imply that only proximate species are indented one place, yet mechanical difficulties render it impracticable to so arrange that all species shall be indented under their proximate genera.

Indention properly carried out has a tendency to prevent in the process of logical division the logical fault of proceeding from a high or broad genus to a low or narrow species. This latter fault may inadvertently separate things that belong together. If, for example, it were desired to divide balls in the stated illustration according to material, an immediate division of balls into aluminum, zinc, glass,

¹ Any class of objects may be called a "genus" if it be regarded as made up of two or more different kinds of objects or of two or more species. "Motors" is a genus when the class "Motors" is considered as divided into electric motors and nonelectric motors, or electric motors, spring motors, weight motors, current motors, fluid pressure motors, etc. A genus is more extensive than any of its species but less intensive.

A "species" is any class that is regarded as forming a part of the next larger class, "electric motors" being a species of "motors" and "motors" being a species of "energy transformers." A species is more intensive than the genus to which it belongs but less extensive.

Every species may be a genus to another species until no further subdivisions can be made. This last indivisible species is termed the *infima species*. Every genus may be a species to another genus until a point is reached where no further generalization may be made or the *summum genus* is attained. In the Patent Office classification of the useful arts, the *summum genus* is useful arts. The *summum genus* of the plastic arts would be plastics. The *infima species* in the useful arts evidently never can be attained.

"Proximate species" and "proximate genus" indicate, respectively, those species that are divided from a genus without intermediate genera, and those genera from which the species are directly divided. Motors, and not energy transformers, is the proximate genus to the species, fluid motors, electric motors, etc., while fluid motors, electric motors, etc., and not steam engines, alternating current motors, etc., are proximate species to motors.

ivory, rubber, would be less useful than to divide into mineral materials and nonmineral materials as follows:

Balls—
 Mineral—
 Nonmetallic—
 Glass.
 Metallic—
 Aluminum.
 Zinc.
 Nonmineral—
 Vegetable—
 Rubber.
 Animal—
 Ivory.

However, it is evident that indention carried to its full extent, useful as it is in keeping analogous things together, would make the printing of schedules complex and unwieldy. Nevertheless, in the generalizing process necessary in logical division and arrangement, the divisions of species should always be *mentally indented*, as it were, under their *proximate* genera. Thus, under a genus unnamed may be arranged several species in juxtaposition, without actually printing the name of the genus, so that the schedule above may read:

Balls—
 Glass.
 Aluminum.
 Zinc.
 Rubber.
 Ivory.

In an arrangement printed in idea-order, though relegating the genera mineral, nonmetallic, metallic, nonmineral, vegetable, animal, to the mind unaided by printed words, the different species of the same genus may be kept together except that species for which no title has been provided must go back to the subclass under which the named species are indented. Thus the arrangement above necessitates placing in subdivision "Balls" all *copper* balls, whereas indention under proximate genus "metal" would have brought all metal balls together. In a finely divided classification, printing of titles for all genera is not practicable; hence great care ought to be directed toward grouping species according to the principles of arrangement herein outlined, noting that whenever a change of basis is made, a new genus is implied, and that subclasses for all other species of the same genus, under whatever name, must be brought into juxtaposition as if indented under the implied genus.¹

¹ In the Manual of Classification of the U. S. Patent Office the arrangement of subclasses has always been alphabetical, although in the Supplement containing definitions of revised classes the arrangement is numerical. If the latter schedule of "Balls" in the text had been printed in alphabetical order, it is apparent that the species "Aluminum" and "Zinc" of the genus Metal would be as widely separated as possible. In the former schedule of "Balls," in which the genus Metal is printed, "Aluminum" and "Zinc" come together. It is apparent that in an alphabetical arrangement allied species can not be kept together without printing every proximate genus. This fact, among others, indicates the advisability of abandoning the alphabetical arrangement in the classification manual and adopting the idea arrangement in the schedules of revised classes, supplemented by a consolidated alphabetical index of all subclasses.

Bifurcate division.—Most discussions of classification make reference to the so-called bifurcate scheme of division as the only one by which exhaustive division can be surely achieved. This is commonly illustrated by the ancient tree of Porphyry. By this method any subject it is desired to subdivide is first divided by writing the name of one selected species at one branch and writing at the other branch the name of the same species prefixed by "Not." Thus the Agassiz classification of living beings divides them first into sensible and not sensible (plants). A botanical classification divides plants into flowering and not flowering. A zoological classification divides animals into vertebrate and not vertebrate. By continuing the process of division in the same manner, the division is obviously exhaustive of the subject, there being always a negative subdivision to receive any subsequently created or discovered species. Although bifurcate division has been ridiculed by some, it is agreed by highest authority that it is the only plan of division by which one can be sure to have a consistent place for everything, or by which one can be certain that the divisions are mutually exclusive. It can be demonstrated that a classification schedule in which the relation of genera and species is shown by indentions, if correctly formed on the principles now sought to be applied in the revision of the Patent Office classification, is susceptible of conversion into a tree of Porphyry, while unlike the latter it is compact and wieldy.

Utility of arrangement according to resemblances.—The expedient of indicating kinds of relationship between several equally indented divisions by relative position has the following utility:

(1) A uniform rule is provided, applicable to all classes, for placing inventions that bear the relation of whole to part in subdivisions before those that bear the relation of a part to that whole, and those that are defined by a particular effect, product, material, or use before those that are defined by a function or an operation applicable generally to various effects, products, materials, or uses; whereby that portion of the schedule in which any invention belonging to any particular class should be found may be approached whether or not the investigator knows the name of the object sought for or the title of the appropriate subdivision.

(2) The substantial impossibility of dividing many branches of the useful arts exhaustively into a reasonable number of mutually exclusive or non-overlapping subclasses is compensated for; so that when the classifier or the searcher has an invention to place or to find including two or more different kinds of characteristics, for each of which a subdivision is provided, but no subdivision for the plural characteristics, it will be known that the invention should be in the subclass for that characteristic which stands before the subclass for the other characteristic.

(3) It compensates for omission of some generic titles that if written in the indented schedule would lengthen specific titles to a cumbersome extent.

(4) It provides a rule for cross-referencing where several inventions are claimed bearing to each other any of the relationships indicated above, cross-referencing being necessary in one direction only where the matter illustrated is coextensive with the matter claimed.

(5) It definitely limits the field of search for any *unitary invention* in any class so arranged, as no patented invention having the limitations imposed by a unitary claim should be found in any subclass below the subclass properly defined to receive it or those indented under it. Parts of such inventions may be found below or following this subclass in the same class if these parts are within the class definition, or elsewhere in the useful arts if not within that definition. The unitary invention may be found in the subclass limited to it and certain subclasses arranged *above* or *before* it adapted to receive organizations of which it may be a part.

A complete system of arrangement should comprise (1) a display of the entire field of the useful arts in a manner to show the relation of the larger as well as of the smaller groups,—carrying the appropriate relationship as far as possible from the highest genera to the lowest species, the arrangement being such as would bring materials most nearly alike into closest propinquity regardless of the names they may be called by. (2) Supplementary to this classification arrangement by ideas there should be an alphabetical index of subclass titles, appropriately cross indexed, and additional titles of various technical and trade names of things classified under subclass titles.

DEFINITION.

Definition is indispensable in any classification and is very difficult. Every class must be defined and all of the groups under it. After definitions have been made and printed, they are sometimes found inadequate and must be supplemented by the definitions of other classes. This is unavoidable while the complete material remains unexplored. Definition in the strict logical sense is not to be expected, nor is it necessary. It is commonly sufficient if an explanation or comparison be made sufficient to direct the mind to the character of the contents of the group and indicate its limitations. Hitherto four of the five predicables of ancient logic have been mentioned, to wit, genus, species, property, and accident. In connection with definition, the fifth predicable, difference, is useful. To define a class, it is sufficient, generally, for the purposes of office classification, to state a *peculiar property* (not an accident) of the objects included in the

class; and to define a species under the class it is sufficient to state the name of the class plus the difference—i. e., with the addition of the limitations that characterize the species.¹ This procedure in definition is susceptible of application from the highest genus to the lowest species. It is advisable to define the means included within a title without any introductory words, such as “this subclass includes inventions relating to,” etc., treating the subclass for definition purposes as if it were a collection of concrete things, in the same manner as in a dictionary definition.

CROSS-REFERENCES AND SEARCH-NOTES.²

If patents were in all respects like material objects, cross-references and search-notes would not be necessary. Nails, screws, locks, hinges, and boxes are distinct things susceptible of definite separation and classification. Even though nails, screws, locks, and hinges form part of the box, the box is still a box, not a nail, screw, hinge, or lock. For the needs of the Patent Office classification, however, although a patent for a box must be classified with boxes, yet if a peculiar nail, screw, lock, or hinge is claimed in the same patent with the box, or even if any one of these customary accessories of boxes is illustrated, it may be necessary to provide copies of the patent for the box in each of the several classes provided for nails, screws, locks, or hinges.

Inasmuch as every relatively complex thing is made up of relatively simple things, it is obvious that all disclosures can not be cross-referenced. Any attempt to calculate the number of cross-references to be supplied if all disclosures of the subjects of invention were to be cross-referenced would show the number to be incalculable. It is necessary, therefore, to leave to the judgment of the classifier the propriety of cross-referencing unclaimed disclosures.

Should a patent contain a number of claims defining a number of differently classifiable inventions, complete cross-referencing from

¹ A species contains all the qualities of the genus and more. These additional qualities form the “difference.” The electric motor has the qualities that are common to motors and is differentiated by reason of the fact that electric energy is thereby converted to mechanical motion.

² Classification of a patent is said to be “original” in the class and subclass which receives the most intensive claimed disclosure, and in which the patent is indexed in the official classification indexes. “Original classification” is referred to as opposed to “classification by cross-reference.”

A “cross-reference” is a copy of a patent placed in a subclass other than that in which the classification is made original, in order to make available for search inventions disclosed therein and additional to that by which the patent has been diagnosed and classified.

A “digest cross-reference” is a cross-reference formed from abstracts or extracts from a patent consisting of illustration and text cut from a photolithograph of a patent and mounted.

A “search-card” is a sheet of the size of a photolithograph of a patent placed with the photolithographs of patents forming a subclass in the examining division and public search room, and containing suggestions for further search, and on the copy for the search room, a definition of the subclass.

“Search notes” are addenda to class and subclass definitions comparing other classes and subclasses with the one defined and giving directions for search when necessary to prosecute search beyond the defined class or subclass.

the class in which the classification is made original into the other appropriate classes or subclasses should be effected, *unless* cross-search notes or arrangement of subclasses with appropriate titles may be substituted to advantage.

Cross-referencing or cross-search notes are made, as a rule, from combination class to element class, but never or very rarely from the element class to the combination class in which it may be used. Thus cross-referencing should normally be downward in a schedule of subclasses. Search notes indicate parallel or otherwise related classes and subclasses, and those classes and subclasses in which analogous structures having different purposes but adapted to answer broad claims may be found.

By arbitrary rules of arrangement such as have been referred to in the section dealing with division and arrangement, a search may ordinarily be definitely limited to a certain number of subclasses, even where cross-references are not made. In such arrangement any given patent, *if it be directed to one invention*, may be searched in the subclass within which the definition places it or subclasses indented under it, and in certain subclasses above, whose titles will indicate that the invention might be included as a part of the matter defined to belong therein, but it would never have to be searched in any subclass following and not indented thereunder.

DIAGNOSIS TO DETERMINE CLASSIFICATION.

Each patent and each application discloses one or more means of the useful arts (using the term "means" to cover both processes and instruments in the sense in which it is used by Prof. Robinson), almost always more than one, since most new means are combinations of mechanical elements or acts. In some patents and applications the disclosure is coextensive with that which is claimed; in others there is matter disclosed but not claimed. The unclaimed disclosure may be as valuable as the claimed disclosure for purposes of anticipation, and the classification must provide for both. If the claimed disclosure belongs in one class and the unclaimed in others, the classifier must choose between two or more classes that one in which the patent or application shall be classified and those into which it shall be cross-referenced.

Claimed or unclaimed disclosure.—The claims of a patent are the statutory indices of that which the applicant believes to be new, they define an invention that has been searched by the Patent Office and no anticipation discovered for it. Future action must be based on inductions from past experience; none knows what the future lines of search will be; the only guides for future searches are the searches of the past; the evidence of past searches is the claims

of patents; they trace the course of invention. Furthermore, a presumption of novelty attaches to the claimed matter; no such presumption attaches to the unclaimed. The law requires every patent for improvement to show so much of the old as is necessary to explain the uses of the improvement. In practice much more than that is disclosed. Questions as to the proper placing of patents and cross-references would be diminished by the strict enforcement of Rule 36 of the Rules of Practice requiring that the description and the drawings, as well as the claims, be confined to the specific improvement and such parts as necessarily coöperate with it. In any event both the claimed disclosure and that which is unclaimed must be taken care of, one by cross-reference, and the disclosure selected for cross-reference is that to which no presumption of novelty attaches.

This practice of placing patents by the claimed disclosure is sometimes misunderstood. Its chief application is in determining classification in case of disclosures involving a plurality of main classes. Furthermore, the mere letter of the rule is not to be applied in preference to its spirit. Subcombinations claimed may be placed with the combinations, and in subordinate type subclasses patents must be placed sometimes by claimed and sometimes by not-claimed disclosures.

Diagnosis of pending applications.—What has been said relates to patents. The bearing of the practice of adopting the claimed disclosure as the basis of assignment of applications for examination has also to be considered.

Two pending applications claiming the same means very commonly differ in the kind and extent of disclosure. One application may disclose several inventions. Which of the several disclosures shall be selected as the mark by which to place the application? For instance, the typical wire-nail machine has a wire-feeding mechanism, a shearing mechanism, an upsetting (forging) mechanism, side-serrating mechanism, and pointing mechanism; it may also have a counting mechanism, a packaging mechanism, an electric motor on its frame for furnishing power; and, in addition, numerous power-transmitting and other machine parts, such as bearings, oil-cups, safety appliances, etc. The applicant may have made a complete new organization of nail-machine and may seek a patent for the total combination. He may have invented a new shearing mechanism and have chosen to show it thus elaborately in the place of use he had in mind, or he may have designed a new counter or a new oil-cup or a new power transmission, or even a new motor, and have given his invention this elaborate setting. The shears, the counter, the oil-cup, the power transmission, and the motor are separately classifiable in widely separated classes. How shall the application be diagnosed for determining its place in the office classification? When the

specification and drawing disclose (as most of them do) several subjects matter of invention, though claiming only one, which of those several subjects matter shall control the classification?

The most natural procedure, at first thought, would be to classify on the totality of the showing, in which case the application for the nail-machine, supposed above, would be assigned to nail-making. But imagine the invention claimed by an applicant to be the counter. Then the examiner in charge of nail-making would have to search the class of registers with which he is not familiar. Suppose applicant No. 2 files an application for the same counter which he illustrates and describes in connection with a bottle-filling machine, and that, classifying on the totality of the showing, this goes to the division that has the class of packaging liquids. Now both the examiners in charge of bottle-filling and nail-making, knowing that counters are classified in registers, search the class of registers and also the pending applications in registers. After these examiners have made their searches, suppose applicant No. 3 files an application for the same counter, which he says may be used for counting small articles produced by automatic machines. Perhaps he shows the counter attached to a piece of conventional mechanism representing any manufacturing machine, mentioning, say, a cigarette or pill or cartridge-making machine. It has not occurred to either the the examiner of nail-making or the examiner of bottle-filling that the other might have any such application; nor does it occur to the examiner in charge of registers to search nail-making or bottle-filling. As the specification of the counter application mentions cigarette, pill, and cartridge-making machines to which the counter may be attached, the examiner in charge of registers may search those classes. Suppose that the counter proves to be new, and each of the three examiners allows a patent. Here now are three patents for the same thing. Of course, after allowance, the counter and all other disclosed inventions that give any suggestion of novelty are cross-referenced; but the primary purpose of a patent office classification (to aid in determining patentability) has failed in this instance.

In the imagined situation respecting pending applications, without doubt diagnosis and classification upon the invention claimed is necessary to effect the purpose of the office classification. Cross-referencing after issue can not undo that which has been done.

If no application save that of the nail-machine be pending, no duplication of patents occurs, but the labor of search is increased by reason of the unfamiliarity of the examiner with the inventions he has to search. After the patent is allowed he may find the entire combination of the nail-machine without the counter disclosed in a patent for a nail-making machine, so that as a nail-making machine

this new patent is of no value as a reference. Very probably all of the other inventions illustrated (except the counter) are also old in their respective classes; but the examiner of nail-making can not tell this without extensive searches in those classes, so he notes cross-references for them all.

Difficulties due to varying ideas of claims.—Very troublesome questions are constantly arising as to whether an invention should be classified in a combination class or an element class. The point will be illustrated by example: A describes and illustrates an automobile having an internal-combustion motor and a friction-clutch in the motor transmission-gear. He states that the clutch is in the usual relationship to the motor and gearing, but claims a new clutch for whatever it may be adapted. B discloses an internal-combustion motor said to be for automobiles with transmission-gearing and a friction-clutch and claims "in an internal-combustion motor a friction-clutch," etc., specifying the form of the clutch. C makes the same disclosure, but claims "an internal-combustion motor having a specified clutch," while D, with the same disclosure, claims "the combination with the internal-combustion engine of an automobile" of a specified friction-clutch. E claims and illustrates only the friction-clutch. Should these be classified together? If so, in what class? Should a bearing composed of a specified alloy of copper, tin, and antimony, be classed as a bearing or as an alloy? Should a house painted with a mixture of linseed oil, lead oxid, and barium sulphate go to buildings or coating compositions? A lamp-filament of titanium and zirconium with electric lamps or with alloys? A building-block of cement, lime, sand, and carborundum, with building-blocks or plastic compositions? Whether these be diagnosed as combinations or as elements and compositions respectively, and classified accordingly, criticism will be aroused. The point in view is that although principles of patentability must be considered in a classification designed as an instrument to aid in determining patentability, convenience and accuracy of search and avoidance of voluminous cross-referencing may necessitate some arbitrary rule of classification to meet various and changing theories applied to the drafting and allowance of claims.

From the foregoing it will be evident that classification involves orderly logical processes of induction (supplemented by hypothesis), of definition and of deduction. After gathering a large number of facts generalizations are made from them and a hypothesis is found to be confirmed or modified by more extended research; the divisions are then defined; by correct diagnosis of other instances (as other patents) deductions may be drawn respecting the appropriate place for them in the classification.

(C) RULES OF CLASSIFICATION.**BASIS OF CLASSIFICATION.**

(1) The basis of subdivision and assemblage of the means of the "useful arts" in the Patent Office classification is "art" within the meaning of "art" in section 4886, Revised Statutes. The direct, proximate or necessary art, operation or effect, rather than some accidental and remote use or application, should be selected. In all cases qualities or characteristics that persist through all accidental uses and that can be identified as permanent are to be preferred.

(2) The operative, instrumental, or manipulative arts, including machines, tools, and manufacturing processes, should be classified according to whether a single operation of one kind applicable to various materials to be used for various purposes is carried out by the claimed means, or whether plural operations are performed, which, combined, produce a special effect or special product.

Example: An instrument performing a plurality of operations peculiar to shoe-manufacture would be classified on the basis of shoemaking, because that instrument would be incapable of other use, while an instrument peculiarly adapted to drive nails would be classified on the basis of nailing, whether for nailing shoe-heels or other objects, and a hammer would be classified on the basis of its function as an impact tool even though described as for driving nails, and even into shoe-heels.

(3) Structures (passive instruments) will, in general, be classified on the basis of structure, either of special or general application, the essential functions and effects of static structures being resistive or the maintaining of forces in equilibrium.

Example: A structure recognized as peculiar to barriers of the kind known as fences would be classified in the special class of Fences, but posts, joints, beams, etc., recognized as having use in general building, even though described as used in fences, would be classified in a more general building class, such as Wooden Buildings or Metallic Building Structures.

(4) Compositions of matter and manufactured or formed stock or materials will be classified in accordance with the inherent character of the substance or material where possible, otherwise according to special use.

Example: A pure chemical is expected to be classified on the basis of its chemical structure and constituents, even though useful as a food, medicine, dyestuff, explosive, etc., and alloys on the basis of metallic composition, even though used for bearings, coins, tools, etc.; whereas a physical composition having no reason for existence except to function as a cleansing composition or a paint might have to be classified on the basis of its function as a detergent or a coating composition, respectively. Also a bimetallic layered foil, plate, or wire would be expected to be classified as metal stock even though designed for use for dental filler, plowshare, or electric conductor, and a woven textile fabric as a fabric even though described as used for a filter or apron for a paper-making machine.

DIVISION AND ARRANGEMENT.

(5) The divisions or subclasses of a class should be made exhaustive, i. e., they should be susceptible of receiving any future invention that may fall within the scope of the class. The rule as usually phrased is: "The constituent species must be equal, when added together, to the genus." Exhaustive division may be secured by maintaining always a residual or miscellaneous subclass. The miscellaneous subclass represents the remainder of the original undivided material undefined except as the class is defined and may be accurately treated as if it had the class title.

(6) A second rule respecting the subdivision of a class is: "The constituent species must exclude each other." That is, the divisions or subclasses must not overlap. (See exception in Rule 8.)

Example: If a number of balls of several different materials, several different conformations, or constructions, several different colors, were to be divided into glass balls, hollow balls, and red balls, this rule would be violated, because some balls would be glass, hollow, and red.

(7) A third rule respecting subdivision is: "The divisions must be founded on one principle or basis." The application of this rule will generally form divisions that do not overlap. (See exception in Rule 8.)

Example: If a number of balls of several different constructions, several different materials, and several different colors were to be classified so as to provide a place for each kind of characteristic, they should be divided first, for example, according to construction into hollow balls and solid balls, each of these according to materials into glass balls, rubber balls, metal balls, wooden balls, etc., and each of the latter into red balls, blue balls, green balls, etc.

(8) When it is found that division into overlapping subclasses and on different characteristics is a lesser evil than an unwieldy number of subclasses that would otherwise result, then those subclasses based on characteristics deemed more important for purposes of search should precede in the list of subclasses those based upon characteristics deemed less important. (See Rule 6.)

(9) In arrangement of subclasses or subdivisions the miscellaneous groups containing material not falling within any of the specifically entitled subclasses, should stand first; those subclasses defined by effect or special use should precede those defined by function or general use; those containing matter that is related to the matter of other subclasses as whole to part should precede those subclasses that contain the part; and those defined by a characteristic deemed more important or significant for search purposes should precede those defined by characteristics deemed less important.

Whenever superior rank has been assigned to any selected characteristic by placing divisions based upon it in advance of divisions based

upon other characteristics, *this superiority should be maintained throughout.*

Example: A partial schedule of Class 80 follows to illustrate the arrangement of subclasses:

Class 80.—METAL ROLLING.

- | | |
|-------------------------|-----------------------------------|
| 1. Miscellaneous. | 24. Die rolling— |
| 2. Heating and rolling. | 25. Oscillating rolls. |
| 3. Cutting and rolling. | |
| 4. Drawing and rolling. | Mills— |
| 5. Annular bodies. | 32. Coiling. |
| 6. Screw threads— | 33. Work reversing. |
| 7. Concave and roll. | 34. Three or more coacting rolls. |
| 8. Platen rolling— | 35. Continuous— |
| 9. Dies. | 36. Inclined trains. |
| 10. Rods and wires. | |
| 11. Tubes— | 41. Roll cooling and heating. |
| 12. Idle rolls. | 42. Cooling beds. |
| 13. Axial rolling. | 43. Feeding— |
| 14. Segmental rolls. | 44. Tables. |
| 15. Skelping. | |
| 16. Wheels and disks. | 55. Housings. |
| 17. Reworking. | 56. Roll adjustments— |
| 18. Concave and roll. | 57. Relief devices. |
| 19. Platen and roll. | 58. Rolls— |
| 20. Platen rolling— | |
| 21. Disk platens. | 60. Processes— |
| 22. Axial rolling— | |
| 23. Pattern rolls. | 66. Flanged bars. |

In this schedule the miscellaneous subclass is numbered 1, then follow three subclasses (2–4) of rolling plus another function, then four major subclasses (5–16) of rolling, merely, but applied to blanks of special form producing special products, then one special subclass (17) based upon a special class of material treated, then five subclasses (18–31) specialized in type and mode of operation, then general types of rolling mills (32–40), then various parts and accessories (41–59), then processes (60–66). This is the usual arrangement and is an exhaustive division for the art of metal rolling. Had there been miscellaneous subclasses for all combined operations of rolling plus some other function, a miscellaneous subclass for all mere rolling machines, either special or general, and a miscellaneous subclass for all parts and accessories, the requirements of exhaustive division would have been also satisfied.

In the illustrative schedule, there being no miscellaneous subclass for means having combined functions of rolling and another, any patent having claims for the combination of a means for rolling and a means for cooling would fall in subclass 1, Miscellaneous. In that subclass would also fall all “Mills,” such as for rolling spiral conveyer-flights, the same not falling under any of the subclasses 32–40, no miscellaneous subclass of “Mills” and no special article-rolling subclass having been provided; also all parts or accessories, such as a water-cooled screen, peculiarly adapted to rolling-mills, there being no existing subclass of screens therein and no miscellaneous subclass of parts. The arrangement of subclasses in Class 80 requires that the combination of a furnace and a rolling-mill shall be placed in subclass 2, even if the combination be designed and adapted for rolling annular bodies (subclass 5) or tubes (subclass 11). Means special to rolling a tube between a concave and roll must be placed in subclass

13 rather than in subclass 18. A work-reversing mill must be placed in subclass 33 rather than in subclass 34 even though it have three or more coacting rolls.

The rolling of "Screw-threads" having been given higher rank than a "Concave and roll" mechanism, any concave and roll mechanism limited for use in rolling screw-threads should be formed into a subclass indented under "Screw-threads" and not into a subclass "Screw-threads" indented under "Concave and roll."

(10) Class schedules are arranged with certain subclasses appropriately indented according to a commonly understood expedient. In a properly indented schedule subclasses in column at the extreme left are the main species (the proximate species) of the class. The titles and definitions of all subclasses proximate to the class (at extreme left) must be read with the title and definition of the class, as if indented under the class title one space to the right; so also with the titles and definitions of subclasses indented under other subclasses. If a title has no number (as in Class 80, "Mills"), it represents merely a subject-matter to be divided, assumed to have no representatives other than those in the species indented under it. If a title having indented species under it has a number, it not only represents a subject to be divided but also a subclass including all other species not falling within the indented titles. Indention does not indicate superiority or inferiority, but merely that the title and the definition of the indented subclass must be read with the title and definition of the subclass under which it is indented. A title selected in a scheme of subdivision to be of first importance and placed, therefore, in advance, should not thereafter be indented under a title selected to be of secondary importance and, therefore, having a lower position. (See Rule 8.)

(11) A group of material may be divided on several different bases. "Use" or "purpose" or "object treated" may be adopted only when the "use" or "purpose" or "object treated" stamps upon the invention such peculiarities of operation or construction as to limit the applicability of the invention to the use or purpose named. (See Basis of Classification, Rule 1.) A group based upon mode of operation also may be divided into subclasses (1) with a "functional" title, usually participial in form, and adapted therefore to receive machines, processes, and tools; (2) with special use, purpose, or object-treated title containing the name of the use, purpose, or object; (3) with "type" title, usually a name or a name with a qualifying adjective; (4) with a title of a part or subcombination, also a name.

Example: In Class 90, Gear-Cutting, Milling, and Planing, are to be found subclasses entitled "Gear-cutting," certain machines being peculiar to that use; also other subclasses with the general functional title "Planing," subordinate to which are the special use subclass "Planing, Soft metal," and the type subclass "Planers" divided into two coordinate subclasses, "Reciprocating bed" and "Reciprocating cutter," and several subordinate "part" subclasses, including "Tool-feeds" and

"Tool-heads." The adjective form of the title "Planers, Reciprocating bed," indicates a type subclass. If the title had been Planers, Reciprocating beds, the indication would be that the subclass was a part subclass to receive planer beds only. In the class referred to for illustration, "Tool-feeds" and "Tool-heads" indicate subclasses for parts and not for types of planers having tool feeds.

(12) In arranging the divisions of a class, such arrangement should be sought as will minimize the need of cross-references. Search for any particular matter can not always be limited to one group without such extensive cross-referencing as would in some cases defeat the purpose of classification. Forming the subdivisions of a class according to the total similarities of the inventions, rather than according to some selected more or less important characteristic, and arranging them in the correct order of superiority and inferiority, with care to maintain throughout the schedule the relative positional values of the several selected bases of division, will ordinarily in a closely bonded class limit the search for any single invention to the subclass particularly suited to receive it and some subclasses preceding that one, excluding from the necessity of search the subclasses succeeding.

Example: In Class 80, Metal-Rolling, it would not be expected to find any tube-rolling mill lower in the schedule than the tube-rolling subclasses, but a tube-mill might be found higher up in "Heating and rolling," "Drawing and rolling," etc. No concave and roll combination should be found succeeding the subclass of "Concave and roll," but it may be found under subclasses above, such as "Tubes, Screw-threads," etc. No rolls should be found lower than the subclass of "Rolls," but they may be found in many subclasses above.

DEFINITION.

(13) Having some knowledge of the nature of the materials about to be classified, a tentative definition of a class to be formed may be framed, which may be either written down or merely carried in mind, to serve as a tentative guide. This tentative definition must be considered as subject to change to any extent by the fuller knowledge obtained by careful consideration of the material. After a full knowledge of the materials to be classified has been acquired, it will be necessary to frame a careful definition of the class, and also of each subclass whose title does not unequivocally indicate what is contained in it.

(14) A definition of any class should state the "qualities and circumstances possessed by all the objects that are intended to be included in the class and not possessed completely by any other objects." A proper definition should not ordinarily contain the name of the thing defined. "Definitions in a circle" are, of course, worthless. A definition should be exactly equivalent to the species defined and should not be expressed in obscure or ambiguous language, but should employ terms already defined or perfectly understood. It should not be in negative form where it can be affirmative. If

the class of objects has a peculiar property, the naming of that may serve as a definition. If no peculiar property can be detected, the definition should name more than one quality or property. Several different classes may have one or more properties alike, but as the number is increased the likelihood of there being others having the same properties is decreased. The briefest possible statement of such properties or qualities as are possessed by all the objects of a class and not completely possessed by any other objects, which will suffice to distinguish the class from other classes and determine its position in the general classification, will be most satisfactory. To define any species, the genus having been defined, the genus should be named and the difference added. Of course, no generic definition should contain any limitation not characteristic of every species of the defined genus. In seeking qualities by which to describe a genus or species, no accident should be selected.

Example: Suppose there be marked out and defined as a genus all means whereby one form of energy is transformed into another form of energy and no more, and the genus be named energy-transformers. We may then name, as species, energy-transformers that are motors and energy-transformers that are not motors. Motors may be defined by merely naming the genus energy-transformers, and stating the difference, to wit, continuously transforming energy into cyclical mechanical motion. Then the definition will be: Energy-transformers that are adapted to continuously transform energy into cyclical mechanical motion. The non-motor division will retain the genus definition.

It would not be illuminating for a searcher having little familiarity with the textile arts to look under the title "Carding" and find that carding is defined as a means for carding fiber.

Even though the first steam-engine invented had been used to run a gristmill, the accident of its use as a part of a gristmill would hardly warrant the definition of a steam-engine as a means to grind corn. Nor would a hammer be properly defined as an instrument to drive nails or to crack nuts or to forge horseshoes, even though a patent should not mention any use other than one of these and should lay heavy emphasis on the special value of the hammer as a nut cracker, nail driver, etc.

(15) In those cases where the title is so obvious that definition is superfluous, explanatory notes may be substituted and will usually be found helpful.

CROSS-REFERENCES AND SEARCH-NOTES.

(16) Inasmuch as nearly every patent discloses unclaimed matter that is classifiable separately from the claimed matter, it is clearly impossible to cross-reference every disclosure of every means in every patent. Many things must be taken as conventional, obvious, or well known, and the good judgment of the classifier is bound to be exercised in cross-referencing matter disclosed but not claimed to be the invention of the patentee.

(17) A mere part or element should rarely be cross-referenced from an element class to a superior combination class. An element

forming part of a combination in a superior class should, if claimed, be cross-referenced to the element class and also if not claimed if it seems to be not merely a conventional form, and patents having claims for more than one differently classifiable invention should always be cross-referenced unless such an arrangement of subclasses with search-notes is substituted as will guide the searcher to all places where the material may be found. Claimed matter additional to that which controls the classification, if belonging in the same class, should be cross-referenced into a *succeeding* subclass. Cross-references of unclaimed disclosure may be in either direction.

(18) To supplement or take the place of cross-referencing, more or less elaborate search-notes are needed, giving directions and suggestions for further search, setting out the relationship between classes and subclasses, and drawing distinctions by example. Search-notes should indicate other classes or subclasses in which the subject-matter of the group to which the search-notes are appended is likely to form a part of a more intensive combination, also analogous matter that might serve as a reference for a broad claim. They need not, in general, indicate where parts or elements of the subject-matter which are common also to other classes can be found, because the index of classes contains the necessary information. For example, it is not necessary in every machine-class to indicate by search-notes where machine-elements and static parts may be found, nor in a class of wooden boxes to point out where the nails, screws, hinges, or locks that may form a part of the box are classified.

DIAGNOSIS TO DETERMINE CLASSIFICATION.

(19) Inasmuch as nearly every patent contains disclosure that is claimed and also disclosure that is not claimed, it has been deemed advisable to establish the general rule that where the claimed and unclaimed disclosures are classified in different classes or subclasses the invention both disclosed and claimed shall determine the placing of a patent (or a pending application) rather than any selected invention that may be disclosed but not claimed. "Not claimed" covers means that may form an element only of a claim as well as means not referred to in any claim. (See exceptions in Rules 21 to 22 inclusive.)

Example: A patent discloses and claims a dash-pot but illustrates it in such relation to a metal-planing machine as to utilize it for checking the movement of the bed at one end of its path, or in connection with an electric generator to aid in effecting the brush adjustment; the patent should be classified in the subclass of Dash-pots. If the classifier finds the disclosed organization of dash-pot and planer or dash-pot and generator more than a conventional illustration of an obvious use, he should note a cross-reference to Planers or Electricity, Generation. A patent discloses an internal-combustion engine associated with a specific form of carbureter; the claims relate to the engine parts only; the class of Internal-Combustion Engines should receive the patent, and a cross-reference should be placed in Carbureters. A patent discloses and specifically claims the combination of a rail-joint comprising abutting rails, fish-

plates, and specific bolts; the patent goes to an appropriate class of rail-joints, and if the bolt is more than a mere obvious conventional bolt, a cross-reference should be noted for the appropriate subclass of Bolts.

(20) The totality of the claimed invention should be selected when possible to determine the appropriate class in which to place a patent. The entire expression of the invention will usually be set forth in the most relatively intensive claim.¹ In a properly drawn patent there is at least one claim that will serve as a mark to indicate the classification of that patent.

(21) Where a patent discloses but does not claim a combination of proper scope to be classified in a combination subclass and claims merely a detail classified in a subclass lower in the schedule, both in the same class, if the subclasses are so related that the combination always involves the detail so that a search for the detail must necessarily be made in the combination subclass, the patent may be placed in the combination subclass. This avoids the need of a cross reference into the combination subclass, and a lack of a copy in the detail subclass is immaterial, as it is seen in the completion of the search through the combination subclass. (See Rule 19.)

Example: A patent for a saw-making machine discloses dressing, jointing, and gaging mechanisms; it claims dressing and jointing only. There is a subclass for dressing, jointing, and gaging, and a subclass for dressing and jointing. In this case the patent may be placed in the first-mentioned subclass, as that must be searched always when the second-mentioned one is searched, cross referencing in this situation being of little value.

(22) Where a subclass with a generic title has indented thereunder a species type-subclass bearing the title of the generic subclass qualified by a difference, any patent which claims an invention falling within the genus subclass and discloses the qualification of the species type-subclass should be classified in the latter whether or not the entire disclosure is claimed. (See Rule 19.)

Example:

	Class 29.—METAL WORKING.
	Machine chucks and tool sockets—
	Cam closing—
126.	Scroll—
127.	Bevel pinion or ring.

¹ All terms have a meaning in extension and in intension. The meaning of a term in extension consists of the objects to which the term may be applied; its meaning in intension consists of the qualities necessarily possessed by objects bearing that name. The term "motors" in extension means all motors—electric, gas, water, spring, weight, etc. "Motors" in intension means instruments to convert some form or manifestation of energy into periodical or cyclical motion of a body. As the intension increases the extension decreases, and *vice versa*. There must be more motors than there are electric motors, and electric motors have more qualifications than are common to all motors. Comparison of arts and instruments with respect to their extension and intension for classification purposes should be made between comparable qualities. A claim for a steam-engine may be very specific while a claim for a reaper may be very broad; here there is no comparable relationship, and the terms intensive and extensive do not have the relative significance most useful in classification. But when a patent or application contains claims for mechanism peculiar to electric motors and other claims for mechanism common to electric motors and other kinds of motors, the claims for the electric motor would control the classification.

If a patent claimed only the scroll of a scroll-chuck, but disclosed it in connection with a bevel pinion and ring, it should be classified in subclass 127, Bevel pinion and ring, and not in subclass 126, Scroll, although if there were no disclosure of the bevel pinion and ring it would go in subclass 126. Any search for scrolls must be prosecuted through all subclasses that include "Scroll" in the title.

(23) Where, as in the case of patents that show and claim a combination that as matter of common knowledge is not new except in one of its elements, to classify a patent strictly in accordance with rule would result in placing the patent where it would serve no useful purpose as a reference and having to cross-reference it to a class where it would serve a useful purpose, it is best to classify the patent in the class to which the element would take it. (See Rule 19.)

Example: A patent claiming a wheeled vehicle, broadly, in combination with an internal-combustion engine comprising a cylinder, a crank-case, a piston and suitably-connected crank, a valve opening into the crank-case, and a valve in the piston opening into the cylinder, may be advantageously classified as an internal-combustion engine notwithstanding the alleged invention is for a motor vehicle.

(24) In order to meet the situation respecting the classification of those patents that indiscriminately claim an article of manufacture defined only by the material of which it is made and those patents that claim those materials, leaving to the specification information regarding the designed uses, patents for articles defined only by their ingredients specifically set forth may be placed in the composition of matter or material class. (See Rule 19.)

Example: A patent having a claim for a cutter made of an alloy of iron, tungsten, and manganese would be classified with Alloys; a patent claiming a box made of paper composed of two layers united by a solution of asphaltum should go to the class of Laminated Fabric and Analogous Manufactures, rather than to paper boxes; and a patent for a house having its exterior coated with equal quantities by volume of carbonate of lead and oxid of barium suspended in a vehicle of linseed-oil would be classified as a paint rather than as a house.

(25) An alleged process of utilizing a specifically-defined composition or material which consists in merely applying it to the use it was designed for may be classified as a composition or material rather than as a process. (See Rule 19.)

Example: A process of painting the bottom of a marine vessel which consists in applying thereto a composition consisting of sulphate of copper, powdered metallic zinc, chlorid of antimony, and hyposulphite of soda, in a vehicle of linseed oil, would be more usefully classified as an antifouling paint than as a ship, as the invention would hardly be distinguishable from a paint claimed as such and described for use on submarine surfaces.

(26) An alleged process consisting merely in the use of a particularly-defined machine or similar instrument operating according to its law of action will ordinarily be classified in the class or subclass

where the machine belongs. But if in addition to defining the operation of a particular machine the claim also specifies acts not performed by the machine, the classification should be in the class or subclass in which the process belongs. (See Rule 19.)

Example: Thus a claim for a method of rolling an iron plate which consists in passing an iron blank between a pair of rolls arranged horizontally in juxtaposition one above the other and geared together so as to rotate in opposite directions, and causing an idle roll supported in bearings on the roll-housings to bear against the central portion of the surface of one of the first pair of rolls on the upper side thereof, should be classified as a rolling-mill, while if to that claim were added the steps of doubling the sheet after one passage between the rolls, again passing between the rolls, again doubling, and then passing the now four-ply pack between the rolls sidewise or turned 90 per cent to the direction in which it had previously been fed, the classification should be with processes of sheet-metal manufacture.

(27) In the absence of settled rules defining permissible joinder of inventions, there may be in one patent claims for one or more or all of the classes of invention named in the statute, to wit, machine, art, manufacture, and composition of matter. There may also be claims to several more or less related inventions in the same statutory class of invention but each belonging to a different industrial art. (1) Where different main classes are involved, the patent will be classified by the most intensive invention, without regard to the statutory class to which it belongs. (2) Where different subclasses of the same class are involved, the patent will be classified in that one of the several subclasses defined to receive the several inventions which stands highest in the schedule of subclasses.

(28) Where a patent contains claims for all or a plurality less than all of the statutory classes, the general rule of preference or superiority of the several classes or subclasses is that represented by the following order, to wit: (1) Machine (or other operative instrument); (2) Art; (3) Manufacture; (4) Composition of matter. This order is, in a general way, the order of intensiveness of the several kinds of invention. (See Rules 29–35.)

Example: An automatic screw-machine, peculiarly adapted to carry out a process of making a novel form of machine-screw out of a new iron alloy, and having a claim to the machine, to the process, to the screw, and to the alloy, would be assigned to Metal-Working, Combined machines, and, if all claims were allowed, cross-referenced to Bolt and rivet-making processes, to Bolts, and to Alloys. If the claim to any one or two of the subjects were eliminated, the order of preference or superiority and the order of cross-referencing would remain the same.

(29) Patents containing a plurality of claims for several different statutory kinds of invention that are classifiable in different main classes, and wherein the rule of relative intensiveness varies from the order Machine, Art, Manufacture, and Composition of matter, may be diagnosed and classified as directed in the following paragraphs (30 to 35).

(30) Where a patent contains claims for a process and for an apparatus susceptible of use as an instrument in carrying out the process, but not peculiar to that use, or for an apparatus adapted to carry out but one step or only a part of the process, the process claim, being in this instance the more intensive, would control the classification. (See rule 28.)

Example: In a patent containing a claim for a process of roasting ore and then collecting the fumes, and another claim for a roasting furnace that is a mere material-heating furnace, the process claim would control; whereas, if one claim were for a method of roasting ores consisting of stirring the ore, applying heat to the same, and collecting the solids from the fumes, and the other claim were for a heating furnace having a stirrer and a fume arrester, the apparatus claim would control. And if a patent contained claims for a process of roasting ores, and other claims for a furnace susceptible of use in carrying out the process but equally useful in annealing glass or steel articles, the process claim would control.

(31) Where a patent claims a specified article of manufacture or other product, and also an instrument for making a part only of that specified article or other product, the product claim, being more intensive, should control the classification; so also in case of a claim for a product and a claim for an instrument performing any minor act with respect thereto. (See Rule 28.)

Example: Where a patent claims a particular construction of a riveted joint, and also a tool for calking the rivet, and where a patent claims a particular construction of shoe, and also a buttonhook for buttoning said shoe, the article and not the tool claims control.

(32) Where a patent contains claims to a process and a product, the process claims govern the classification in those cases where search among machines for making the product would have to be made, and such processes would be classifiable on the basis of the mode of operation, usually in the same class with machines for practicing such processes. (See Rule 28.)

Example: A patent having a claim for a process of making bifocal lenses, consisting in grinding the surface of one piece of glass to form a convex lens, heating another piece of glass until it is plastic, then forcing the ground surface of the first-named piece into the body of the latter and gradually cooling the lens-blank thus formed; and also a claim for a bifocal lens composed of two pieces of glass weld-united, would be classified in Glass-manufacture and cross-referenced into lenses. Or a patent having a claim to a process of making a metal plate with elongated perforations, consisting in forming round perforations in the plate and subsequently rolling the plate, thereby thinning and elongating the plate and elongating the openings, and also a claim to a metallic plate having relatively long and narrow perforations, would be classified on the basis of the process claim.

(33) Where a patent claims both process and product, and the alleged process is disclosed in the product, so that search would have to be made in the appropriate class of products, the product will be adopted as the basis of classification, and classification will be in the appropriate product class. (See Rule 28.)

Example: A claim for a process of making a pencil consisting in assembling a core of graphite with a sheathing of wood, and attaching a cap of rubber-composition to one end, would be classified as a pencil rather than as a process, because conception of the article is inseparable from the process and search must be made in the article class.

(34) Where a patent claims a process of making a composition of matter, and also the composition of matter, the claims will be classified in general in accordance with the classification of the composition of matter in all cases where the process is peculiarly adapted to produce the composition, as by setting forth the introduction or assemblage of particular ingredients, since those processes that include the selection of particular ingredients necessitate search among compositions having such ingredients. (See Rule 28.)

Example: A patent having a claim for a composition consisting of a mixture of caoutchouc and casein, and a claim for the process of preparing a rubberlike substance which consists in adding undissolved raw caoutchouc to casein and thoroughly mixing and kneading the mass, would be classified according to the composition.

(35) Where a patent claims a product such as a specific article of manufacture, or a specific composition of matter, and also claims a process of general application for making one of the parts of the article or one of the ingredients of the composition, the product claim should control the classification. (See Rule 28.)

Example: If a patent claimed a woven textile fabric having the yarns interlaced in a defined relation, and a process of spinning a yarn utilized in the fabric; or if a patent claimed a varnish composed of shellac, dissolved in wood alcohol, and a pigment, and also contained a claim for distilling wood to obtain the alcohol, the product claim would control the classification in each instance, and the process would be cross-referenced.

(D) PROCEDURE IN RECLASSIFYING WITHIN EXAMINING DIVISIONS.

(1) Do not start to make a new class or revise an old one with preconceived fixed notions respecting its scope and the particular subdivisions required. Wait until all patents pertinent to the subject have been seen and adequate knowledge of them acquired. In other words, make no *a priori* classification but discover and assemble all the facts and from them make your inductions. Then the common characteristics of the subject-matter of the class may be intelligently defined, the limitations of the class marked out, and its relation to other classes set forth. Bear in mind that the Patent Office classification deals with the subject-matter of the useful arts rather than merely with existing classes, and that it is not therefore essential to retain classes that are found to be composed of unrelated or too distantly related units.

Assuming that the work of reclassification is undertaken by examiners who are already experienced in the subject-matter to be classified, procedure as follows is recommended:

(2) Utilizing your previously acquired knowledge of the patents in the class you are about to revise, subdivide the existing subclasses into bundles, so as to assemble in each bundle those patents deemed to have the closest resemblance to each other. For the purpose of this assemblage, consider each patent as an entirety and not with reference to various more or less important parts of that entirety.

Example: An apparatus comprising in alleged combination a means for decauting water, a means for electrolytically depositing impurities, and a means for filtering the water, should not be classified either as a decanter, an electrolytic apparatus, or a filter, but should be classified as a combination apparatus (taking it to the general art of liquid purification). So also the combination of a rotary printing-press with a folding mechanism, and a wrapping mechanism, should not be classified merely as a rotary printing-press, a folding machine, or a wrapping machine, but should be classified as a combination of the several mechanisms as an entirety whose functions carried out in proper order produce a printed and wrapped newspaper.

(3) Write an approximate or tentative definition of the matter thus assembled in each bundle and attach it to its appropriate bundle.

(4) Where it appears that the subject matter of any bundle formed from the patents of any subclass is analogous to matter in other subclasses of the same class or in other classes, a note should be added to that effect so that this matter may be given special consideration.

(5) When the same examiner or different examiners are working on different subclasses containing analogous matter, parallel lines of subdivision should be followed wherever possible, in order to effect an arrangement that will facilitate comparisons.

(6) When subdividing a group of more or less complex organized structures or mechanisms, note should be taken of subcombinations that form or it is thought should form the basis of other subclasses, either in the same or different classes, into which those details may be collected, either classified therein originally or by cross-reference.

Example: Assuming that the combination of press, folder, and wrapping mechanism, referred to in a preceding paragraph is to be classified in a class of Printing, on the entirety as a combination having the function of printing, plus other functions, and that folding and also wrapping are separately classified, then the particular type of press should be selected to be cross-referenced into a press-type subclass of the class of Printing, such as "Presses, rotary," while the folding mechanism and the wrapping mechanism would be noted for cross-reference to other appropriate classes. Also, any part of the printing press, such as the inking mechanism, specifically described, should be noted for cross-reference into a subclass of Printing designed to receive the inking mechanism as a part of the printing press.

(7) After a knowledge of the material of the class has been obtained by estimating the resemblances between the individual patents that

have been assembled in the several groups, comparison of these groups, represented by the bundles of photolithographs, by the aid of the approximate definitions and notes attached can be made. It can then be decided whether all of these groups are to be retained in the proposed class, and the retained groups can be organized into a class with the subclasses arranged so as to bring those subclasses having the strongest resemblances in closest relation, and in such order as to comply with the conventions adopted in the official classification. It will probably be necessary to have one subclass or group as broad as the definition of the class, to take unclassifiable matter and to provide for possible future inventions.

(8) Up to this point, more or less cursory attention may be given individual patents; but when an arrangement of subclasses shall have been tentatively adopted it will be necessary to consider each patent carefully to ascertain whether it is properly placed.

(9) Patents that, considered as an entirety, cover means not peculiar to the class or subject-matter being revised, should, in general, when assembled in groups as indicated, have a note attached indicating not only want of limitation to the subject-matter of the class but also a more appropriate class to receive them if such there be. Although a very large proportion of patents can be accurately classified as indicated by their titles and stated uses, the mere fact that in a patent found in a class the invention is called in the specification or claims by a name peculiar to the class is not of itself a reason for considering it peculiar to the class. A gas and liquid contact apparatus may be called a heater, a cooler, a gas-washer, a water-carbonator, a condenser, a disinfecter, an air-moistener, and so on, depending upon accident of use. If there are not elements in some claim to confine the means described distinctively to what it is called, or if there are no functions necessarily implied in the means claimed peculiar to the named use, the patent should not be kept in the class unless there is no other class in the office that can receive it.

Example: Where the matter claimed is a metal beam of peculiar cross-section, it should be classified with other metal beams, as in Class 189, Metallic Building Structures, even if it is named in the application as a beam of particular use, as a railroad-tie, car-sill, bridge-tie, etc. Should a mere dash-pot be found classified in Class 171, Electricity, Generation, a note should be attached indicating that it belongs in the appropriate element class.

(10) In giving this final careful attention to the patents, each should also be scanned to see whether it contains matter that should be cross-referenced. A few lines obscurely located in a specification may contain a disclosure of a most valuable invention. No class can be deemed complete until the disclosures appropriate to it found as parts of more complex inventions in other classes, or disclosures of analogous matter in other classes, are either cross-referenced into it or cross search-notes made.

(11) To indicate cross-references, from one subclass to another within the class or from the class under consideration into another class, attach a small slip of paper to the patent and mark on the slip the subclass number in which the cross-reference shall be mounted. If the matter to be cross-referenced relates only to a portion of a voluminous patent, the portion of the specification and drawing to be cross-referenced should be indicated. If the cross-reference falls outside the class, the class number should be noted in addition to the subclass number.

(12) Should it be found that the handling of copies in making examinations detaches the cross-reference slips, it may be advisable to mark lightly but legibly in pencil on the lower right-hand corner of the examiner's photolithograph the number of the subclass or subclasses into which it is to be cross-referenced, or the number of the class and subclass in case it is to be cross-referenced to another class.

(13) Whether cross-reference notations are written on a separate slip or on the photolithograph, the number of the class and subclass into which a patent is to be cross-referenced should always be preceded by X (thus X 101-23) in order to distinguish the original classification notation from the cross-reference notation and enable sorting and indexing to be done without confusion.

(14) To indicate cross-references from other classes into the one being reclassified, set down the number of the patent in a notebook, placing after the number (1) the class and subclass in which it is classified; and (2) the number of the class and subclass in which it is to be cross-referenced.

(15) Should new subclasses be formed or transfers of patents be determined on, and lists of the patents, instead of copies thereof, be furnished clerks for the purpose of making such subclasses and transfers and correcting the official indexes and other records, each patent should be listed by number in column to the left of a sheet of paper or notebook, and opposite each patent number on the same sheet should be written (1) the number of the class and subclass in which it is officially classified; (2) the number of the class and subclass to which it is intended to transfer it; and (3) the numbers of the classes and subclasses, preceded by X, into which it is intended to cross-reference it.

Note: Even though examiners engaged in reclassifying are confident of their ability to classify and arrange on better principles than those that have been applied thus far in the classification, they ought, nevertheless, to follow those principles under which one-half of the patents have been classified. Until the Commissioner of Patents orders examiners to classify on other principles, it is expected they will follow those now established.